CLAIMS

We claim:

1. A joist comprising:

a bottom chord;

a top chord; and

a web affixed therebetween,

wherein said top chord has a first elongated structural angle and a second elongated structural angle, said first structural angle having in cross-section a horizontally-extending leg and an upwardly-extending leg meeting at a corner, said second structural angle having in cross-section a horizontally-extending leg and a downwardly-extending leg meeting at a corner,

wherein an upper portion of said web is joined to said top chord second structural angle against said downwardly-extending leg, and said first structural angle is joined to said second structural angle.

2. The joist of claim 1, wherein a portion of said horizontally-extending leg of said second structural angle is positioned between said upper portion of said web and a portion of said horizontally-extending leg of said first structural angle, and wherein said upper portion of said web abuts said corner of said second structural angle.

3. The joist of claim 1, wherein a portion of said downwardly-extending leg of said second structural angle abuts a portion of said upwardly-extending leg of said first structural angle, and wherein said upper portion of said web abuts said corner of said first structural angle.

4. The joist of claim 1, wherein said corner of said first structural angle abuts said corner of said second structural angle, and wherein said upper portion of said web abuts said corner of said second structural angle.

5. The joist of claim 1, wherein a top portion of said upwardly-extending leg of said first structural angle has in cross-section a bend.

6. The joist of claim 1, further comprising:

a shoe attached to a longitudinal end of said top chord.

7. The joist of claim 6, wherein said shoe has a T-shaped cross-section, and wherein said top chord second structural angle, at said longitudinal end of said top chord, is coped to allow said shoe to be attached to said first and second structural angles to be flush with a longitudinal end of said first structural angle.

8. The joist of claim 1, wherein said upwardly-extending leg of said first structural angle has a series of transverse protrusions and indentations, whereby a protrusion on one side of said upwardly-extending leg has a corresponding indentation located transversely on the opposite side of said upwardly-extending leg, and said protrusion and corresponding indentation are each located at the same longitudinal position along the length of said top chord.

9. The joist of claim 8, wherein on each side of said upwardly-extending leg of said first structural angle, said protrusions are longitudinally adjacent said indentations and said indentations are longitudinally adjacent said protrusions.

10. The joist of claim 1, further comprising:

at least one splice in one of said structural angles of said top chord.

11. The joist of claim 10, further comprising:

at least two splices, said first structural angle having one of said splices and said second structural angle having another of said splices,

wherein said at least two splices are longitudinally offset along the length of said top chord.

12. The joist of claim 1, wherein said web comprises a series of adjacent compression and tension members.

13. The joist of claim 12, wherein said web includes two series of adjacent compression and tension members with a gap therebetween.

14. A composite slab and joist assembly, said assembly comprising:

the joist of claim 1;

at least one deck panel positioned on one of said horizontally-extending legs of said top chord of said joist;

slab reinforcement positioned above said joist and said at least one deck panel; and

a slab of concrete formed on said at least one deck panel and on the top of said joist, said slab enclosing said slab reinforcement and a top portion of said joist.

15. The assembly of claim 14, wherein said slab reinforcement is a mesh.

16. A method of manufacturing a joist, said method comprising:

orienting first and second elongated structural angles so that, in cross-section:

said first structural angle has a horizontally-extending leg and an upwardly-extending leg meeting at a corner, and

said second structural angle has a horizontally-extending leg and a downwardly-extending leg meeting at a corner;

joining said first structural angle to said second structural angle to form a top chord;

joining an upper portion of a web to said second structural angle against said downwardly-extending leg; and

joining a bottom chord to a bottom portion of said web.

17. The method of claim 16 further comprising:

adding a series of transverse protrusions and indentations to said upwardly-extending leg of said first structural angle, whereby a protrusion on one side of said upwardly-extending leg has a corresponding indentation located transversely on the opposite side of said upwardly-extending leg, and said protrusion and corresponding indentation are each located at the same longitudinal position along the length of said top chord.

18. The method of claim 17, wherein on each side of said upwardly-extending leg of said first structural angle, said protrusions are added longitudinally adjacent said indentations and said indentations are added longitudinally adjacent said protrusions.

19. The method of claim 18, wherein said series of transverse protrusions and indentations are added by stamping said first structural angle.

20. The method of claim 18, wherein said series of transverse protrusions and indentations are added by inserting said first structural angle between a pair of counter-rotating dies, each of said dies having at least one protrusion and at least one indentation, said dies set so that a protrusion from one die and an indentation from the other die simultaneously deform said first structural angle therebetween to add a protrusion and a corresponding indentation.

21. A method of manufacturing a composite slab and joist assembly, said method comprising:

manufacturing a joist according to the method of claim 16;

positioning at least one deck panel on one of said horizontally-extending legs of said top chord of said joist;

positioning slab reinforcement above said joist and said at least one deck panel; and

forming a slab of concrete on said at least one deck panel and on the top of said joist, said slab to enclose said slab reinforcement and a top portion of the joist.

22. In steel and concrete structures having at least one pair of spaced-apart parallel joists, each of which includes at least a top chord, and wherein a wooden form is normally mounted between the respective top chords of the pair of joists for subsequently pouring a concrete slab therebetween, the wooden form subsequently being removed once the concrete has cured, the improvement wherein the top chord of each joist comprises two complementary structural angles including first and second structural angles secured to each other, the first structural angle having an upwardly-extending leg and a horizontally-extending leg forming a first corner therebetween, the second structural angle having a downwardly-extending leg and further having a horizontally-extending leg forming a second corner therebetween, the horizontally-extending leg

of the second structural angle extending in a direction oppositely of the horizontally-extending leg of the first structural angle, the first and second angle members being disposed such that their respective corners substantially engage or confront one another, thereby forming in cross-section a substantially "plus" symbol, a panel permanently mounted horizontally between the pair of joists, thereby providing a concrete form, and concrete poured over the panel to form a slab, thereby eliminating the necessity of constructing, and subsequently removing, the wooden form between the pair of joists.

23. The improvement of claim 22, wherein the panel comprises a metal corrugated panel.

24. The improvement of claim 22, wherein the respective upwardly-extending legs of the first structural angles have alternately-disposed protrusions and indentations, respectively, thereby improving the bonding of the joists to the concrete slab.

25. The improvement of claim 22, wherein each joist further includes a bottom chord connected to the top chord by a web.

26. The improvement of claim 25, wherein the web includes compression and tension members, each of which has an upper end and a lower end, the respective upper ends being connected to the downwardly-extending leg of the second structural angle, thereby providing improved structural integrity.

27. The improvement of claim 22, wherein the structure includes girders, beams, or walls on which the joists are supported, and wherein a reinforcing shoe is disposed at the respective ends of the joists and contact the girders, beams, or walls of the structure.

28. The improvement of claim 26, wherein each joist further includes a bottom chord comprising a pair of complementary structural angles having respective upwardly-extending spaced-apart legs for securing therebetween the lower ends of the respective compression and tension members of the web.

29. In a building structure having at least a first joist which includes a top chord, a bottom chord, and a web therebetween, the web including compression and tension members, each of which has respective upper and lower ends, the improvement in which the top chord includes at least one structural angle having a horizontally-extending leg and a downwardly-extending leg, and wherein the respective upper ends of the tension and compression members of the web are secured to the downwardly-extending leg of the structural angle.

30. The improvement of claim 29, further including an additional structural angle having an upwardly-extending leg and further having a horizontally-extending leg disposed oppositely to the horizontally-extending leg of the other structural angle, both structural angles members being connected thereto to form, in cross-section, a substantially "plus" configuration.

31. The improvement of claim 30 further including a second joist parallel to and spaced apart from the first joist, wherein a corrugated metal panel is secured between the respective top chords of the first and second joists, and wherein a concrete slab is poured over the corrugated metal panel and between the respective top chords of the first and second joists.

32. The improvement of claim 31, wherein the respective upwardly-extending legs of the additional structural angles of the top chords of the joists have respective alternating protrusions and indentations, thereby improving the bonding of the joists to the concrete slab.